APR 2 8 2016

ENFORCEMENT ACTION MEMORANDUM

SUBJECT: Approval of a Time-Critical Removal Action at the West Lake Landfill Site, Bridgeton, Missouri

FROM: Tom Mahler, On-Scene Coordinator
Missouri/Kansas Remedial Branch

THRU: Lynn M. Juett, Branch Chief
Missouri/Kansas Remedial Branch

TO: Mary P. Peterson, Director
Superfund Division

CERCLIS ID:	MOD079900932
Operable Unit:	01
SSID:	0714
Removal Category:	Enforcement Time-Critical
Nationally Significant/Precedent-Setting:	No

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval and funding for a time-critical removal action at the West Lake Landfill Site (site) in Bridgeton, St. Louis County, Missouri. The time-critical removal action will involve the implementation and installation of engineering controls within portions of the Bridgeton Landfill to mitigate potential impacts to OU-1 due to potential subsurface, exothermic, self-sustaining chemical reactions (SSR). This will include the installation of a Heat Extraction System (HES) within the "Neck" area between the North and South Quarry portions of Bridgeton Landfill; a plan for the use of inert gas injection; the installation of an EVOH cover over the North Quarry portion of Bridgeton Landfill; and environmental monitoring. These controls will be put in place to, at a minimum, retard an SSR from migrating through the Neck and into the North Quarry, and take steps to control or extinguish an SSR that may develop independently within the North Quarry. This removal action is expected to be conducted and/or funded by Bridgeton Landfill, LLC, the current owner of OU-2 and current operator of the site. The U. S. Environmental Protection Agency will perform oversight of Bridgeton Landfill's implementation of this removal action.

This time-critical removal action is necessary to mitigate any potential future threat to public health or welfare or the environment posed by the potential mobilization of radionuclides and migration of radon gas in the event an SSR in the North Quarry of the Bridgeton Sanitary Landfill were to come into contact with RIM in the West Lake Landfill OU-1, Area 1. The radiological wastes in OU-1, Area 1 are hazardous substances as defined by Section 101(14) of the Comprehensive Environmental Response,

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Site Name: West Lake Landfill Site ID: 0714

Name	Mahler	Juett	Stoy	Jackson	Peterson	Bishop
Branch	MOKS	MOKS	CNSL	SUPR	SUPR	SUPR
Signature	J. Om.	LMJ	AS		MPP	DBB
Date	4-27-16 LMJ	4/28/16	4/27/16	4-27	4/28/16	4/28/16

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Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601(14), and are designated hazardous substances per 40 C.F.R. § 302.4(b).

II. SITE CONDITIONS AND BACKGROUND

VIII. Site Description

VIII. Removal site evaluation

The Site was historically used for agricultural purposes until a limestone quarrying and crushing operation began in 1939. The quarrying operation continued until 1988 and resulted in two quarry pits. Beginning in the early 1950s, portions of the quarried areas and adjacent areas were used for landfilling municipal refuse, industrial solid wastes, and construction/demolition debris. These operations pre-dated state and federal permitting requirements for landfills. Two areas, designated today as "Area 1" and "Area 2" of the landfill were radiologically contaminated in 1973 when they received soil mixed with leached barium sulfate residues. These two landfill areas constitute OU-1.[1]

The barium sulfate residues, containing traces of uranium, thorium, and their daughter products are associated with uranium ore processing conducted by Mallinckrodt Chemical Company in support of the Manhattan Project. These barium sulfate residues were initially stored by the Atomic Energy Commission (AEC) on a 21.7-acre tract of land in a then undeveloped area of north St. Louis County, now known as the St. Louis Airport Site (SLAPS), which is part of the St. Louis Formerly Utilized Sites Remedial Action Program managed by the U.S. Army Corps of Engineers (USACE).

In 1966 and 1967, the barium sulfate residues located at SLAPS were purchased by a private company for mineral recovery and placed in storage at a nearby facility on Latty Avenue under an AEC license. Most of the residues were shipped from there to Canon City, Colorado for reprocessing with the exception of the leached barium sulfate residues, which were the least valuable in terms of mineral content. Most of the uranium and radium was removed in previous precipitation steps. Reportedly, 8,700 tons of leached barium sulfate residues were mixed with approximately 39,000 tons of soil and then transported to the site. According to the landfill operator, the soil was used as cover for municipal refuse in routine landfill operations. The data collected during the Remedial Investigation (RI) are consistent with this account.

Portions of the quarry pits were used for permitted solid waste landfill operations (Bridgeton Sanitary Landfill or Former Active Sanitary Landfill) beginning in 1979. In December 2004, the Bridgeton Sanitary Landfill stopped receiving municipal waste pursuant to an agreement with the city of St. Louis to reduce the potential for birds to interfere with the Lambert-St. Louis International Airport operations. The EPA placed the site on the Superfund National Priorities List (NPL) in 1990. The NPL is a list of priority sites promulgated pursuant to section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended. The NPL is found in Appendix B of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

In 1993, the EPA entered into an Administrative Order on Consent with the Respondents: Cotter Corporation (N.S.L.), Laidlaw Waste Systems (Bridgeton), Inc., Rock Road Industries, Inc., and the U.S. Department of Energy for the performance of a Remedial Investigation and Feasibility Study. Pursuant to the Administrative Order on Consent, the Respondents submitted for the EPA's review and

[1] OU-2 of the site are those portions of the landfill where non-radiological hazardous substances are present. The EPA issued a Record of Decision for OU-2 in July 2008.

approval a Remedial Investigation which detailed the findings of extensive sampling and analysis in the area of OU-1 and the surrounding area. Following the Remedial Investigation process, the Respondents submitted for the EPA's review and approval a Feasibility Study which evaluated various remedial alternatives for OU-1, consistent with the requirements of the Administrative Order on Consent, CERCLA, and the NCP. In addition, the state of Missouri reviewed and commented on these documents. The Record of Decision documenting the remedy selection for OU-1, which was concurred with by the state, was issued by the EPA in May 2008. This remedy has not yet been implemented.

In December 2010, Bridgeton Landfill detected changes in the landfill gas extraction system in the South Quarry of the Bridgton Landfill, specifically elevated temperatures and elevated carbon monoxide levels. Further investigation indicated that the South Quarry portion of the Bridgeton landfill was experiencing an exothermic subsurface reaction event, which is referred to as a "subsurface reaction" or an "SSR." As a consequence of the SSR, the South Quarry has experienced an increase in odors, elevated waste temperatures, and accelerated decomposition of the landfilled solid waste.

In May 2013, the Missouri Attorney General and Bridgeton Landfill, LLC entered into a First Agreed Order of Preliminary Injunction[2] (state order) under which Bridgeton Landfill performed certain actions to address the SSR. One of the actions specified by the state order was the establishment of trigger criteria for the construction of an "isolation break" between the North Quarry portion of the Bridgeton Sanitary Landfill and the adjacent OU-1, Area 1 cell. With state consent, the EPA assumed lead responsibility for overseeing the evaluation, design, and construction of any subsurface barrier in OU-1, Area 1.

In 2013, Bridgeton Landfill, LLC and Rock Road Industries, Inc. began additional subsurface investigations in the southern portion of OU-1, Area 1 to further delineate the Radiologically Impacted Material in support of the design of the subsurface barrier. Those investigations proceeded in a phased manner, and extended into the summer of 2015. A final report submitted by the Respondents presenting the results of those investigations was approved by the EPA in April 2016.

In January 2014, at the EPA's request, Bridgeton Landfill, LLC and Rock Road Industries, Inc. submitted an evaluation of the possible impacts of an SSR coming into contact with Radiologically Impacted Material. The EPA's Office of Research and Development Engineering and Technical Support Center prepared a March 2014 Memorandum summarizing the observations of this submittal. While not a comprehensive review, the Engineering and Technical Support Center's observations of this submittal included the finding that while an SSR would not cause the Radiologically Impacted Materials to become explosive or cause non-RIM materials to ignite, there was a concern that the heat associated with an SSR could induce surface cracks and fissures in the landfill cover that could potentially allow fine particulates to escape and/or allow for the increased emission of radon gas from the landfill.
In April 2014, the EPA, Bridgeton Landfill, LLC, and Rock Road Industries, Inc. entered into an Administrative Settlement Agreement and Order on Consent for Removal Action – Preconstruction Work (EPA Docket No. CERCLA-07-2014-002). Pursuant to this order, the Respondents agreed to conduct certain activities necessary or deemed appropriate by the EPA to advance, support, and prepare for the design, construction, and maintenance of an isolation barrier intended to prevent the SSR from impacting the Radiologically Impacted Material.

In August 2014, at the EPA's request, the U.S. Army Corps of Engineers submitted an Isolation Barrier Alignment Alternatives Assessment Report. The 2014 assessment focused on the proposed barrier

[2] In the Circuit Court of St. Louis County, State of Missouri; Case No. 13SL-CC01088.

alignments, the feasibility of constructing the Isolation Barrier, the comparative advantages and disadvantages of the proposed alignments, and the associated risks. In October 2014, at the EPA's request, Bridgeton Landfill, LLC submitted a Barrier Alternatives Assessment. In that document, the stated objective of an isolation barrier would be to prevent the possible hypothesized impacts that may occur if radiologically-impacted material in Area 1 of OU-1 were to be heated to levels consistent with those observed in conjunction with the SSR in the South Quarry area of the Bridgeton Landfill. The document went on to state that this objective presumes that the SSR would migrate north-eastward from the South Quarry area of the Bridgeton Landfill into and through the North Quarry area of the Bridgeton Landfill and continue into OU-1, Area 1. Finally, in November 2015, the U.S. Army Corps of Engineers provided an Isolation Barrier Alignment Alternatives Assessment Report to the EPA, which was a supplement to their August 2014 assessment report.

2. Physical location

The site is located on a parcel of land that is approximately 200 acres in size and is located in the northwestern portion of the St. Louis metropolitan area. It is situated approximately one mile north of the intersection of Interstate 70 and Interstate 270, within the city limits of Bridgeton in northwestern St. Louis County. The Missouri River lies about two miles to the north and west of the site. The site is bounded on the north by St. Charles Rock Road and on the east by Taussig Road. Old Saint Charles Rock Road borders the southern and western portions of the site. The Earth City Industrial Park is adjacent to the site on the west. The Spanish Village residential subdivision is located less than a mile to the south.

3. Site characteristics

The site consists of the Bridgeton Sanitary Landfill (Former Active Sanitary Landfill), the West Lake Landfill, and other inactive areas with sanitary and demolition fill which are no longer operational. The address is 13570 St. Charles Rock Road. The site is divided into two operable units. OU-1 addresses two of the inactive landfill areas, Area 1 and Area 2, where radiological contamination is located, and the area formerly described as the Ford Property and is now the Buffer Zone / Crossroads Property. The other landfill areas where radiological contaminants are not present constitute OU-2.

There are other facilities and operations located and conducted on the 200-acre parcel which are not included in the site. These include an asphalt batch plant, a solid waste transfer station, and a leachate pre-treatment plant.

VIII. Release or threatened release into the environment of a hazardous substance, or pollutant, or contaminant

As described above, the Remedial Investigation and subsequent investigations have documented the presence of radiological contamination in the OU-1, Area 1 and 2 cells and the near-surface soils on these cells. The presence of radiological contamination in these areas constitutes a release or substantial threat of release into the environment of a hazardous substance.

VIII. National Priority List (NPL) status

The Site is listed on the National Priorities List (55 Fed. Reg. 35502, August 30, 1990).

6. Maps, pictures, and other graphic representations

The Depiction of the Site is included as an Attachment to this Action Memorandum.

B. Other Actions to Date

VIII. Previous actions

As discussed above, there have been substantial CERCLA investigatory and response actions taken at the site. In addition, actions have been taken at the Bridgeton Sanitary Landfill to, among other things, control emissions and odors as a result of the SSR pursuant to the state of Missouri's solid waste landfill permit and state order.

2. Current actions

On April 20, 2015, the EPA determined that additional work was necessary to accomplish the objectives of the Remedial Investigation/Feasibility Study for OU-1. The OU-1 Respondents recently completed the collection of additional data from Areas 1 and 2, pursuant to a work plan approved by the EPA on September 4, 2015. The data from this effort will be used by the OU-1 Respondents in the development of partial and full excavation remedial alternatives to be evaluated and presented to the EPA in a Final Feasibility Study.

Bridgeton Landfill, LLC and Rock Road Industries, Inc. are also currently implementing an Administrative Settlement Agreement and Order on Consent for Removal Action – Preconstruction Work for the performance of actions that support the design, construction and maintenance of an Isolation Barrier. Air monitoring is currently being performed by these parties pursuant to this Order. On December 9, 2015, the EPA issued a Unilateral Administrative Order to Bridgeton Landfill, LLC, Rock Road Industries, Inc., and Cotter Corporation (N.S.L.) that requires actions at West Lake Landfill (Operable Unit 1) needed to address the risk of a potential surface fire event at the site. Specifically, these actions include the following: (1) placement of interim cover materials over areas of OU1 where RIM is located at or near the surface, (2) clearing of vegetation to mitigate the risk of future surface fires, and (3) the development and implementation of an Incident Management Plan to clearly define the site protocols, notifications, and response activities that will be taken in the event of any future incidents at the site.

C. State and Local Authorities' Roles

1. State and local actions to date

The West Lake Landfill NPL site encompasses several closed landfills. Operable Unit 2 consists of the inactive Bridgeton Landfill (or Former Active Sanitary Landfill) and the Inactive Demolition and Inactive Sanitary Landfills. The Bridgeton Landfill stopped accepting waste in December 2004 pursuant to an agreement with the city of St. Louis due to a runway expansion project at the nearby Lambert – St. Louis International Airport. The EPA issued a Record of Decision in 2008 that defers remediation of the Bridgeton and Demolition Landfills to the Missouri Department of Natural Resources (MDNR) in accordance with existing solid waste permits, closure, and post-closure requirements.

Since 2010, a SSR has been occurring in the South Quarry area of the Bridgeton Landfill in a portion of OU-2. As mentioned above, the Missouri Department of Natural Resources has managed solid waste

issues at portions of the site, particularly with administering and overseeing closure work on the Bridgeton Sanitary Landfill and responding to the SSR. The Missouri Department of Natural Resources has also conducted numerous site inspections, and the Missouri Attorney General has issued a state order, seeking certain response actions at the site.

In 2013, the Missouri Department of Natural Resources requested that Bridgeton Landfill perform certain activities, put in place certain plans to protect against the potential progression of the existing SSR from the South Quarry into the North Quarry, and to prevent the development of an independent SSR in the North Quarry of the Bridgeton Landfill. In August 2015, the Missouri Department of Natural Resources sent a letter requiring work plans and schedules for enhancements to the North Quarry cap and gas collection and control system, to include additional corrective action measures to protect against the potential progression of the SSR from the South Quarry into the North Quarry and measures to protect against the potential for an independent SSR in the North Quarry. Bridgeton Landfill has implemented some, but not all, of the actions requested by the state.

2. Potential for continued state/local response

State authorities will continue to manage the Bridgeton Landfill site pursuant to the 2008 ROD. EPA plans to include MDNR in the review of the design documents and work plans associated with this removal action.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

VIII. Threats to Public Health or Welfare

Where the EPA makes a determination, based on the factors set forth in 40 C.F.R. § 300.415(b)(2), that a release or threat of release of a hazardous substance, pollutant, or contaminant poses a threat to public health or welfare or the environment, the EPA may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release. The factors in 40 C.F.R. § 300.415(b)(2) that apply to this site are:

- **300.415(b)(2)(i) – Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, or pollutants, or contaminants.**

The primary contaminants of concern at the site for this action include Radiologically Impacted Material contained within the OU-1, Area 1 Landfill cell. If the removal actions described in this Action Memorandum are not implemented, the SSR in the South Quarry Landfill cell could migrate into the North Quarry Landfill cell and thence into OU-1, Area 1, or an independent SSR could develop in the North Quarry allowing movement into OU-1, Area 1 at some point in the future. Subjecting certain Radiologically Impacted Material containing wastes in Area 1 to the conditions of a SSR has a potential to cause particulates to migrate and to increase the exhalation of radon gas. This presents a threat of release of hazardous substances into the environment that could present exposures to nearby human populations, primarily to on-site workers.

- **300.415(b)(2)(viii) – Other situations or factors that may pose threats to public health or welfare of the United States or the environment.**

A SSR impacting OU-1, Area 1 could impair the future implementation of the OU-1 remedial action. For example, significant subsidence and increased leachate and gas production has been observed in the South Quarry (OU-2) due to the SSR, as well as, changes to the landfill gases and leachate characteristics. The area surrounding the site includes residences, an airport, and a large number of businesses both commercial and industrial. The EPA is aware that the ongoing SSR and related potential impacts are of great concern to the local community and nearby businesses.

IV. PROPOSED ACTIONS AND ESTIMATED COSTS

VIII. Proposed Actions

VIII. Proposed action description

The proposed action will include the design, construction, and implementation of a variety of engineering controls and contingency plans to retard the existing SSR in the South Quarry portion of the Bridgeton Landfill from migrating through the "Neck" area and into the North Quarry portion of the Bridgeton Landfill. Additionally, these controls and plans will better mitigate the effects of any independent SSRs that may occur within the North Quarry portion of the Bridgeton Landfill. Specifically, these removal actions will include:

1. The use of Inert Gas Injection as a "hot-spot" treatment option to address any SSRs that may occur in the "Neck" area or in the North Quarry of the Bridgeton Landfill;
2. Placement of an EVOH cap over the North Quarry;
3. The installation of a heat extraction system within the "Neck" area of the Bridgeton Landfill in accordance with the *Technical Evaluation of a Heat Extraction Barrier* prepared by Feezor Engineering and dated November 2015; and
4. Environmental monitoring.

Any off-site disposal of waste will comply with Section 121(d)(3) of CERCLA and 40 C.F.R. § 300.440. The EPA will oversee the Respondent's work to implement the proposed action, both by reviewing submittals and approving all construction work in advance, and by overseeing the associated fieldwork.

VIII. Contribution to remedial performance

This proposed removal action will, to the extent practicable, contribute to the efficient performance of the long term remedial action with respect to the release of hazardous substances at and from the site. The remedial action for OU-1 selected in the 2008 Record of Decision and currently being evaluated by the EPA is not contingent on the performance of this removal action. Performance of this removal action would not in any way adversely affect or prevent the implementation of any future remedial actions for the site.

VIII. Applicable or Relevant and Appropriate Requirements (ARARs)

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at 40 C.F.R. § 300.415(j) provides that removal actions shall, to the extent practicable considering the exigencies of the situation, attain ARARs under federal environmental or state environmental or facility siting laws. The following ARARs have been identified for this removal action:

Federal

Action/Prerequisite	Requirement	Citation
NESHAPs	Standard for radon-222 emissions	40 C.F.R. Parts 61 Subpart T
National Pollutant Discharge Elimination System	Storm Water Discharge permitting requirements and conditions for landfills that have received industrial wastes	40 C.F.R Part 122.26 and Part 122.41
Federal Water Quality Standards	Establishes methods to develop ambient water quality criteria for the protection of aquatic organisms and protection of human health	40 C.F.R. 131
Standards applicable to generators of hazardous waste	Manifesting, pre-transport, record keeping	40 C.F.R. Part 262
Identification of hazardous waste	Definition and identification of hazardous waste	40 C.F.R. Part 261
Hazardous Materials Transportation Act	Transportation	49 U.S.C. §§ 801 – 1813, 49 C.F.R. Parts 171 – 180

State

A letter requesting that the state identify ARARs for these actions at the site will be sent. This removal action will attain the state-identified ARARs to the extent practicable and will be incorporated into the proposed action upon receipt of the state's response.

VIII. Project schedule

It is expected that the implementation of these controls will begin within one to two months. The actual implementation schedule will be set forth in the corresponding work plans and subject to the EPA's approval.

B. Estimated Costs

The estimated cost for the Respondent to conduct the activities set forth in this Action Memorandum is $4,159,955. The EPA's costs to oversee the Respondent's work will be reimbursed by the Respondent pursuant to the cost reimbursement provisions of the Order. The total EPA costs for oversight of the work, as set forth in the Order based on full cost-accounting practices, are estimated to be $728,000.00.

V. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delayed action could potentially result in the uninhibited migration of a SSR into certain Radiologically Impacted Material containing wastes in OU-1, Area 1, which would create a release, or threat of release of hazardous substances into the environment and would impair the future implementation of the OU-1 remedial action.

VI. OUTSTANDING POLICY ISSUES

None

VII. ENFORCEMENT

See attached Enforcement Addendum.

VIII. RECOMMENDATION

This decision document represents the selected removal action for addressing the potential future threat of the SSR to certain radiologically-contaminated wastes in the OU-1 Area 1 Landfill cell at the site. The removal action was developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based on the Administrative Record for the site.

Conditions at the site meet the NCP § 300.415(b) criteria for a removal action, and I recommend your approval of this proposed removal action. The total EPA costs to oversee this response action are estimated to be $728,000.00.

Approved:

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Mary P. Peterson, Director Date
Superfund Division

Attachments (2)